

Listing of Claims

48. (Currently Amended) A method of forming an array of ~~compounds~~ ligands on a support having ~~one or more~~ localized areas comprising

(a) locating a dispenser ~~containing~~ to dispense a solution comprising a compound a distance away from a surface of the support;

(b) dispensing a volume of the solution in a single coupling step [droplet] of less than 5 nl from the dispenser to occupy a localized area [with the droplet contacting the surface at a localized area] smaller than 1 cm² on the surface of the support;

(c) allowing the compound to attach directly or indirectly to the surface of the support at the localized area;

(d) repeating steps a through c to attach a same or different compound at a same or different localized area until an array of at least ~~40~~ 100 different ~~reagents~~ ligands, each at different an individual localized area areas is formed and wherein density of localized areas on the support is at least about 1000 localized areas per cm² of surface of the support.

49. (Previously Presented) The method of claim 48 wherein the compound is dissolved in the solution.

50. (Previously Presented) The method of claim 48 wherein the compound is in the form of a pellet.

51. (Previously Presented) The method of claim 48 further comprising the step of contacting the dispenser to the surface of the support.

52. (Previously Presented) The method of claim 48 wherein the support further comprises a cover plate.

53. (Previously Presented) The method of claim 48 wherein the distance away is between about 5 microns and about 50 microns.

54. (Previously Presented) The method of claim 48 wherein the distance away is about 10 microns.

55. (Currently Amended) The method of claim 48 wherein the ~~droplet~~ volume of solution fits within a region having a diameter of less than about 300 microns.

56. (Previously Presented) The method of claim 48 wherein the compound comprises a monomer or a polymer.

57. (Previously Presented) The method of claim 56 wherein the monomer comprises a nucleotide or an amino acid.

58. (Previously Presented) The method of claim 56 wherein the polymer comprises a nucleic acid, oligonucleotide, polynucleotide, peptide, polypeptide, presynthesized polymer, polyurethane, polyester, polycarbonate, polyurea, polyamide, polyethyleneimine, polyacetate, receptor, enzyme, antibody, catalytic polypeptide, hormone receptor, or opiate receptor.

59. (Previously Presented) The method of claim 56 wherein the polymer comprises at least 2 monomers.

60. (Previously Presented) The method of claim 56 wherein the polymer comprises greater than 100 monomers.

61. (Previously Presented) The method of claim 56 wherein the polymer comprises 2, 3, 4, 5, 6, 10, 15, 20, 30, 40, 50, 75, or 100 monomers.

62. (Previously Presented) The method of claim 48 wherein the support is selected from the group consisting of substantially flat substrates, substrates having raised or depressed regions, beads, gels, sheets, particles, strands, precipitates, spheres, containers, capillaries, pads, slices, films, plates, and slides.

63. (Previously Presented) The method of claim 48 wherein the support comprises a gel.

64. (Previously Presented) The method of claim 48 wherein the support comprises biological materials, nonbiological materials, organic materials or inorganic materials.

65. (Previously Presented) The method of claim 48 wherein the support is a disc, square, or circle.

66. (Previously Presented) The method of claim 48 wherein the localized area is smaller than 1mm^2 .

67. (Previously Presented) The method of claim 48 wherein the localized area is smaller than 0.5mm^2 .

68. (Previously Presented) The method of claim 48 wherein the localized area is smaller than $10,000\text{ }\mu\text{m}^2$.

69. (Previously Presented) The method of claim 48 wherein the localized area is smaller than $100\text{ }\mu\text{m}^2$.

70. (Currently Amended) The method of claim 48 wherein the ~~reagents~~ ligands are at least 5% pure in their respective localized areas.

71. (Currently Amended) The method of claim 48 wherein the ~~reagents~~ ligands are at least between about 10% and about 20% pure in their respective localized areas.

72. (Currently Amended) The method of claim 48 wherein the ~~reagents~~ ligands are at least between about 80% and about 90% pure in their respective localized areas.

73. (Currently Amended) The method of claim 48 wherein the ~~reagents~~ ligands are at least greater than about 95% pure in their respective localized areas.

74. (Cancelled)

75. (Currently Amended) The method of claim 48 wherein an array of at least 1000 different ligands ~~reagents~~, each at an individual localized area ~~at different localized areas~~ is formed.

76. (Currently Amended) The method of claim 48 wherein an array of at least 10,000 different ligands ~~reagents~~, each at an individual localized area ~~at different localized areas~~ is formed.

77. (Currently Amended) The method of claim 48 wherein an array of at least 100,000 different ligands ~~reagents~~, each at an individual localized area ~~at different localized areas~~ is formed.

78. (Currently Amended) The method of claim 48 wherein an array of at least 1,000,000 different ligands ~~reagents~~, each at an individual localized area ~~at different localized areas~~ is formed.

79. (Currently Amended) The method of claim 48, wherein step (d) further comprises forming an array of at least 1000 different ligands ~~compounds~~ occupying localized areas within 1 cm² of the surface of the support.

80. (Previously Presented) The method of claim 48, wherein the support comprises glass, derivatized glass, pyrex, quartz, a polymeric material, polystyrene, polycarbonate, silicon or a gel.

81. (Previously Presented) The method of claim 48, wherein the solution of the compound comprises an aqueous solution.

82. (Previously Presented) The method of claim 48 wherein the dispenser comprises a plurality of dispensing units, wherein the plurality of dispensing units is in fluid communication with a solution comprising a compound and wherein step b comprises dispensing a droplet of less than 5 nl from one or more of the plurality of dispensing units.

83. (Previously Presented) The method of claim 48, wherein the support bears at least two reference points for positioning the dispenser over at least one of said localized areas for release of said droplet.

84. (Previously Presented) The method of claim 83, wherein the reference points comprise global reference points for positioning the dispenser over a local region of the surface of the support, and local reference points within the local region for positioning the dispenser over a localized area within the local region.

85. (Previously Presented) The method of claim 83, wherein the dispenser further comprises a camera for identifying the reference points.

86. (Previously Presented) The method of claim 83 further comprising the step of sensing changes in capacitance to identify the reference points.

87. (Previously Presented) The method of claim 83 further comprising the step of sensing changes in light intensity to identify the reference points.

88. (Previously Presented) The method of claim 83 further comprising the step of sensing changes in resistivity to identify the reference points.

89. (Previously Presented) The method of claim 83 further comprising the step of sensing changes in optical properties to identify the reference points.

90. (Previously Presented) The method of claim 83 further comprising the step of sensing changes in magnetic properties to identify the reference points.

91. (Previously Presented) The method of claim 82 wherein the plurality of dispensing units comprises a manifold of delivery lines.

92. (Previously Presented) The method of claim 82 wherein the plurality of dispensing units comprises an array of pipettes.

93. (Previously Presented) The method of claim 82 wherein the plurality of dispensing units comprises a series of tubes.

94. (Previously Presented) The method of claim 82 wherein the plurality of dispensing units includes control valves.

95. (Previously Presented) The method of claim 48 wherein the compound is bound indirectly to the surface of the support via a linker molecule.

96. (Previously Presented) The method of claim 48 wherein the dispenser is moved relative to the support.

97. (Previously Presented) The method of claim 48 wherein the support is moved relative to the dispenser.

98. (Previously Presented) The method of claim 48 wherein the one or more localized areas are spaced less than about 3 mm apart.

99. (Previously Presented) The method of claim 48 wherein the one or more localized areas are spaced less than between about 5 microns and 100 microns apart.

100. (Previously Presented) The method of claim 48 wherein the one or more localized areas has an angular relation between each localized area of about 1 degree.

101. (Previously Presented) The method of claim 48 wherein the one or more localized areas has an angular relation between each localized area of about 0.1 degree.

102. (Previously Presented) The method of claim 48 wherein the support comprises at least about 100 localized areas.

103. (Previously Presented) The method of claim 48 wherein the support comprises at least about 1000 localized areas.

104. (Previously Presented) The method of claim 48 wherein the support comprises at least about 10,000 localized areas.

105. (Cancelled)

106. (Currently Amended) The method of claim 48 wherein the density of localized areas on the support is support comprises at least about 10,000 localized areas per cm² of surface of substrate.

107. (Previously Presented) The method of claim 48 wherein the support comprises a strand including one or more of glass, derivatized glass, quartz, or a polymeric material.

108. (Previously Presented) The method of claim 48 wherein the dispenser comprises a dispenser tip and a sheath encircling the dispenser tip and rigidly extending a fixed distance beyond the dispenser tip.

109. (Previously Presented) The method of claim 48 wherein the surface of the support comprises a hydrophilic or hydrophobic substance.

110. (Previously Presented) The method of claim 48 wherein the surface of the support comprises a photoresist.

111. (Previously Presented) The method of claim 48 wherein the surface of the support is cleaned prior to the step of dispensing a droplet.

112. (Previously Presented) The method of claim 48 wherein the dispenser comprises a pipette.

113. (Previously Presented) The method of claim 48 wherein the dispenser comprises a capillary tube.

114. (Previously Presented) The method of claim 48 wherein the dispenser comprises an electrophoretic pump.

115. (Previously Presented) The method of claim 48 wherein the dispenser comprises an osmotic pump.

116. (Previously Presented) The method of claim 48 wherein the dispenser comprises a cell sorter.

117. (Currently Amended) A method of forming an array of ~~compounds~~ ligands on a support having ~~one or more~~ localized areas comprising

(a) locating a dispenser comprising a plurality of dispensing units a distance away from a surface of the support, wherein the plurality of dispensing units is in fluid communication with a solution comprising a nucleic acid or polypeptide;

(b) dispensing a volume of the solution in a single coupling step [at least one droplet] of less than 5 nl from the dispenser to occupy a localized area, [with the droplet contacting the surface at a localized area] smaller than 1 cm^2 on the surface of the support;

(c) allowing the nucleic acid or polypeptide to attach directly or indirectly to the surface of the support at the localized area;

(d) repeating steps a through c to attach a same or different nucleic acid or polypeptide at a same or different localized area until an array of at least ~~40~~ 100 different ~~compounds~~ ligands, each at an individual localized area, is formed and wherein density of

localized areas on the support is at least about 1000 localized areas per cm² of surface of the support at different localized areas is formed.

118. (Previously Presented) The method of claim 117 wherein the plurality of dispensing units comprises a manifold of delivery lines.

119. (Previously Presented) The method of claim 117 wherein the plurality of dispensing units comprises an array of pipettes.

120. (Previously Presented) The method of claim 117 wherein the plurality of dispensing units comprises a series of tubes.

121. (Previously Presented) The method of claim 117 wherein the plurality of dispensing units includes at least one control valve.

122. (Cancelled)

123. (Currently Amended) The method of claim 117 wherein an array of at least 1000 different ligands, each at an individual localized area ~~compounds at different localized areas~~ is formed.

124. (Currently Amended) The method of claim 117 wherein an array of at least 10,000 different ligands, each at an individual localized area, ~~compounds at different localized areas~~ is formed.

125. (Currently Amended) The method of claim 117 wherein an array of at least 100,000 different ligands, each at an individual localized area ~~compounds at different localized areas~~ is formed.

126. (Currently Amended) The method of claim 117 wherein an array of at least 1,000,000 different ligands, each at an individual localized area ~~compounds at different localized areas~~ is formed.

127. (Previously Presented) The method of claim 62 wherein the compound is a nucleic acid or a polypeptide.

128. (Previously Presented) The method of claim 63 wherein the compound is a nucleic acid or a polypeptide.

129. (Previously Presented) The method of claim 74 wherein the compound is a nucleic acid or a polypeptide.

130. (Previously Presented) The method of claim 75 wherein the compound is a nucleic acid or a polypeptide.

131. (Previously Presented) The method of claim 76 wherein the compound is a nucleic acid or a polypeptide.

132. (Previously Presented) The method of claim 79 wherein the compound is a nucleic acid or a polypeptide.

133. (Previously Presented) The method of claim 80 wherein the compound is a nucleic acid or a polypeptide.

134. (Previously Presented) The method of claim 81 wherein the compound is a nucleic acid or a polypeptide.

135. (Previously Presented) The method of claim 105 wherein the compound is a nucleic acid or a polypeptide.

136. (Previously Presented) The method of claim 106 wherein the compound is a nucleic acid or a polypeptide.

137. (Previously Presented) The method of claim 62 wherein the compound is a nucleic acid.

138. (Previously Presented) The method of claim 63 wherein the compound is a nucleic acid.

139. (Previously Presented) The method of claim 74 wherein the compound is a nucleic acid.

140. (Previously Presented) The method of claim 75 wherein the compound is a nucleic acid.

141. (Previously Presented) The method of claim 76 wherein the compound is a nucleic acid.

142. (Previously Presented) The method of claim 79 wherein the compound is a nucleic acid.

143. (Previously Presented) The method of claim 60 wherein the compound is a nucleic acid.

144. (Previously Presented) The method of claim 62 wherein the compound is a nucleic acid.

145. (Previously Presented) The method of claim 105 wherein the compound is a nucleic acid.

146. (Currently Amended) A method of forming an array of nucleic acids on a support having ~~one or more~~ localized areas comprising

(a) ~~moving~~ locating a dispenser to dispense ~~containing~~ a solution comprising a nucleic acid having greater than 100 monomers a distance away from ~~toward~~ a surface of the support;

(b) dispensing a volume of the solution in a single coupling step [a droplet] of less than 5 nl from the dispenser to occupy a localized area, [with the droplet contacting the surface at a localized area] smaller than $100\ \mu\text{m}^2$ on the surface of the support;

(c) allowing the nucleic acid to attach directly or indirectly to the surface of the support at the localized area;

(d) repeating steps a through c to attach a same or different nucleic acid at a same or different localized area until an array of at least 1000 different ~~reagents~~ nucleic acids, each at an individual localized area, ~~at different localized areas~~ is formed, and wherein density of localized areas on the support is at least about 1000 localized areas per cm^2 of surface of the support.

147. (Currently Amended) A method of forming an array of nucleic acids on a support having ~~one or more~~ localized areas comprising

(a) ~~moving~~ locating a dispenser comprising a plurality of pipettes in fluid communication with a solution comprising a nucleic acid having greater than 100 monomers a distance away from ~~toward~~ a surface of the support;

(b) dispensing a volume of the solution in a single coupling step [at least one droplet] of less than 5 nl from each of two or more pipettes of the dispenser to occupy a localized area, [with the droplet contacting the surface at a localized area] smaller than $100\ \mu\text{m}^2$ on the surface of the support;

(c) allowing the nucleic acid to attach directly or indirectly to the surface of the support at the localized area;

(d) repeating steps a through c to attach a same or different nucleic acid at a same or different localized area until an array of at least 1000 different ~~reagents~~ nucleic acids, each at an individual localized area, ~~at different localized areas~~ is formed, and wherein density of localized areas on the support is at least about 1000 localized areas per cm^2 of surface of the support.